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Construction of a Modern Poultry House and Report of Experiments in Hopper Feeding Laying Hens

BY HORACE ATWOOD

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OPEN FRONT LAYING HOUSE

Experiments in Hopper Feeding Laying Hens

In the production of eggs the main items of expense are for the food required by the fowls; for labor to care for them; for repairs to the buildings and equipment; and for systematically replacing each year the older individuals with younger and more productive birds. The amount and the cost of food required by a fowl in the course of a year has been set forth in former bulletins of this Station.

The cost of labor to care for a fowl for a year depends upon several factors among which may be mentioned the number of fowls kept, the manner in which they are housed, fed and watered, and the facilities for cleaning and keeping the houses in a sanitary condition, and free from lice and mites. As no two poultry houses are the same in all respects it is quite probable that the labor cost of caring for fowls varies widely in different sections of the country and under different conditions.

In an address delivered before the American Poultry Association it was stated that on a certain poultry plant in Maine where two thousand hens are kept in a long laying house the labor cost is thirty-six cents per hen per year. This did not cover the cost of removing the soiled litter, and replacing it with straw or other scratching material.

In this particular instance the cost of labor per fowl, per year, was apparently about one-third as much as the cost of food. On many other egg farms where the arrangements are not so convenient as in the case mentioned it is entirely probable that the labor cost for caring for fowls may amount to one-half as much as the cost for food or perhaps even more.

In practice it is just as important to economize in respect to the cost of labor as it is to increase the egg yield by skillful feeding or breeding, as in both cases the object is to lower the cost of production.

Is there any way of feeding fowls which requires little time and attention and yet which gives good results with respect to egg yield?

HOPPER FEEDING.

On many farms it has been the custom in the past to feed once per day a mash composed of ground grain, beef scrap, etc., moistened with water. Moistening the ground feed and placing it in troughs for the fowls requires considerable time. Experience and good judgment are also required in order to feed just the proper amount. If too much mash is fed the excess is usually wasted, and if not enough is supplied the egg production is restricted to that extent.

In the hopper system of feeding, the grain or dry mash is placed in suitable receptacles so that the fowls can help themselves at will. This materially reduces the cost of labor in feeding the fowls, but do they lay as well? The experiment described below has been performed for the purpose of beginning the study of this subject.

The experiment began December 8th, 1905, with four lots of fowls each consisting of twenty single comb White Leghorn pullets. On January 17, 1906, another pen of twenty White Leghorn pullets was added to the test and the record of this pen also is given. The pullets added to the test in January were hatched later in the season than those in the other four pens and were practically of the same age and weight when added to the test as the other pullets were at the beginning, and it is believed that the results derived from all five pens are to a certain extent comparable. The test was continued for one year.

The method of feeding each pen was as follows:

Pen 1. This lot of fowls was fed shelled corn, beef scrap, and wheat bran, in hoppers constructed so that there was a supply of these feeding stuffs constantly before them. The general health of these fowls was apparently good, although the mortality was heavy, four dying in the course of the year. Those which died were fat and heavy and probably the cause of death was enlargement of the liver.

Pen 2. This pen was hopper fed with corn, beef scrap, and a mixture of equal parts by weight of corn meal, wheat bran, and ground oats. For the first month the corn, beef scrap and ground feed was supplied ad libitum, but as the egg production was very unsatisfactory with a supply of corn constantly before the fowls, the practice was adopted for the remainder of the year of closing the corn orifice early in the morning and opening it again at night when picking up eggs. The fowls in this pen, then, had access to beef scrap and ground grain during the day, and to shelled corn for a short time at night and morning. Three hens died in this pen, one from prolapsus of the oviduct, one was crop bound and the other died from some undetermined cause.

Pen 3. This pen was hopper-fed with (1) a mixture of equal parts by weight of corn, wheat, and oats; (2) beef scrap; and (3) a mixture of equal parts by weight of corn meal, ground oats and wheat bran. As the corn, wheat and oats were mixed together it was thought that it would be possible to make the fowls eat the oats as well as the wheat and corn. It was found in practice, however, that after the oats had accumulted to a certain extent in the trough of the self-feeder they were thrown out by the fowls and some unavoidably wasted, thus making the recorded food consumption for this pen abnormally high. There was no mortality.

Pen 4. This pen of fowls was fed a moistened mash in the morning consisting of a mixture of corn meal, wheat bran, ground oats and beef scrap. Toward evening a mixture of whole grain was scattered in the litter covering the floor of the house. There were no deaths.

Pen 9. This flock was hopper fed with a mixture of equal parts by weight of corn meal, wheat bran and ground oats. In another compartment of the hopper beef scrap was supplied. Once per day a mixture of whole grain was scattered about in the litter so as to induce the hens to take exercise. Two hens died, the cause of death was not determined.

The fowls in this test were confined to the houses and runs described in former bulletins, the houses being about ten feet

wide and twenty feet long and the runs about thirty feet wide by a hundred feet long. No green food was supplied them in winter, but in summer a fair quantity of green stuff grew in the runs but the supply toward fall became limited. In all cases the food was weighed out carefully in bulk for each pen by the Assistant Agriculturist but the actual feeding was intrusted to a farm laborer.

The following table shows the average weight of the hens at the beginning, and end of the test; on May 21st: and on August 25th.

TABLE SHOWING WEIGHT OF FOWLS.

Pen.	1905 Dec. 8	1906 Jan. 17	May 21	Aug. 25	Dec. 8	1907 Jan. 17
1.....	3.50		3.32	3.12	3.70	
2.....	3.48		3.30	3.45	4.00	
3.....	3.45		3.22	3.15	3.85	
4.....	3.50		3.12	3.10	3.77	
9.....		3.52	2.98	3.00		3.77

During May and August the fowls were not so heavy as at the beginning of the test. At the close of the year, however, all of the fowls were somewhat heavier than at the beginning.

The following table shows the amount and kind of food consumed by the various pens of fowls during the year:

POUNDS FOOD CONSUMED.

Pen	Corn	Wheat	Oats	Corn Meal	Wheat Bran	Ground Oats	Beef Scrap	Total
1.....	1024.3				115		50	1189.3
2.....	865			142	142	142	91	1382
3.....	385	375	375	102	102	102	79	1520
4.....	288	288	288	145	145	145	90	1389
9.....	276	276	258	142	148	144	148	1392

The table shows the pens 2, 4 and 9 consumed almost exactly the same amount of food, or in round numbers practically seventy pounds per fowl. The food consumption of pen 1 was

slightly less than in the case of pens 2, 4 and 9, and pen 3 stands higher, probably due to wastage as already noted.

The following schedule of prices has been used in calculating the cost of feed consumed by the fowls. These prices represent as accurately as could be determined the average retail prices which prevailed in Morgantown during the year covered by the test.

Corn $1.08 per hundred.

Wheat $1.50 per hundred.

Oats $1.40 per hundred.

Corn Meal $1.25 per hundred.

Wheat bran $1.25 per hundred.

Ground oats $1.50 per hundred.

Beef scrap $2.25 per hundred.

The following table gives the cost of the food consumed by the experimental pens during the year.

COST OF FOOD.

Pen	Corn	Wheat	Oats	Corn Meal	Wheat Bran	Ground Oats	Beef Scrap	Total
1.....	$11.06				1.44		1.12	13.62
2.....	9.34			1.77	1.77	2.13	2.04	17.05
3.....	4.15	5.62	5.25	1.27	1.27	1.53	1.78	20.87
4.....	3.11	4.32	4.03	1.81	1.81	2.17	2.02	19.27
9.....	2.98	4.14	3.61	1.77	1.85	2.16	3.33	19.84

The table shows that pen 1, fed principally upon corn, was fed for the least money. Next in order stands pen 2, followed in turn by pens 4, 9 and 3. The total cost of food for the year for the hundred fowls which were in this test was $90.65, or slightly more than ninety cents per fowl.

The following table shows the egg production by months for the different lots of fowls:

	Pen 1	Pen 2	Pen 3	Pen 4	Pen 9
1905					
Dec. 8.....	71	46	80	118	...
1906					(Jan. 17)
Jan.	61	138	37	140	69
Feb.	152	199	139	149	232
Mar.	288	398	357	390	406
Apr.	258	357	300	334	332
May	202	295	300	300	323
June	205	299	286	287	299
July	169	278	238	253	323
Aug.	141	227	220	195	241
Sept.	36	99	86	57	172
Oct.	14	23	20	21	52
Nov.	24	32	13	68	...
Dec.	7	16	24	21	27
1907					
Jan. 17.....	...	...	...	...	19
Total 1628		2407	2100	2333	2495

The egg production was not especially heavy with any of the pens of fowls. The best record was made by pen 9, which was hopper fed with mash and beef scrap, and with whole grain once per day scattered in deep litter. Next in order stands pen 2, which had access to corn in a hopper for a short time in the morning and evening. Materially behind all of the other pens, and with a remarkably low egg record, is pen 1, which received corn, beef scrap and wheat bran ad libitum.

The following table shows the average food cost of the eggs per dozen and the cost of food per hen per year.

	Cost of eggs.	Cost of food per hen per year.
Pen 1	10 cts. per doz.	68 cts.
Pen 2	8.5 cts. per doz.	85 cts.
Pen 3	11.9 cts. per doz.	104 cts.
Pen 4	9.9 cts. per doz.	96 cts.
Pen 9	9.5 cts. per doz.	99 cts.

END AND REAR VIEW, SHOWING TWO OF THE VENTILATING SHUTTERS OPEN

The table shows that the food cost of the eggs produced by the different pens during the year varied from 8.5 cents to 11.9 cents per dozen. Pen 2 leads in respect to low cost of eggs, while pen 1 leads in respect to the cheapness of the ration. The hopper fed pens, 2 and 9, produced eggs having a lower food cost, and those laid by pen 1 cost only slightly more, than those laid by pen 4 which received moistened mash.

SUMMARY.

1st. In a year's test with five pens of fowls the cost of food varied from eighty-five cents to one dollar and four cents per fowl per year, and averaged ninety cents per fowl for the one hundred fowls in the experiment.

2nd. The egg production varied from 81.4 eggs per hen in the case of pen 1, fed principally upon corn, to 124.7 in the case of pen 9, which received whole grain once per day, scattered in litter, and dry mash and beef scrap ad libitum in a hopper.

3rd. The food cost of the eggs during the year varied from 8.5 cents to 11.9 cents per dozen.

4th. Two pens, hopper fed, produced eggs having a lower food cost than the pen which received moistened mash, and in this test there was apparently no benefit from the extra labor involved in moistening the mash.

AN OPEN FRONT LAYING HOUSE.

In Bulletin No. 115 of this Station is given a description, together with working drawings of the curtain front laying house which was erected on the Station farm some years ago. This house has continued to give satisfaction in respect to the comfort and health of the fowls. It has been found, however, that the double wall on the north side of the house is an excellent harbor for rats and this method of construction should be avoided in building poultry houses. Recently another house has been erected of a different type, and as it also seems to be well

adapted to West Virginia conditions a description of it should be of interest to West Virginia poultrymen.

The house under discussion is of the open front or Tolman style, and is characterized by having the front completely open or covered only with wire netting in order to keep out stray animals or vermin. The house is twenty-four feet wide and sixty-four feet long and is divided by solid board partitions into four sections, or rooms, each sixteen feet wide and twenty-four feet long. The house is five feet high in front and six above the basement or scratching room in the rear. The roof is of unequal span, the peak being located two thirds of the distance from the front to the rear, and having an elevation above the floor of ten and one-half feet.

Being located on sloping ground, the house was provided with a scratching shed underneath. This portion is about four feet high with a dirt floor and the fowls gain access to it through trap doors placed in each section. This provides a place for the fowls to dust themselves and exercise in winter and is a very desirable feature.

The perches are on a level with the front opening. In winter when the fowls have gone to roost the warm air resulting from their presence tends to collect in the upper portion of the house maintaining a comfortable temperature even in severe weather. Last winter with its zero temperatures the combs of S. C. White Leghorn hens were not frozen even when the front of the house remained constantly open. In poultry houses having a shed roof the warm air constantly flows away from the fowls, when they are on the perches, thus making the shed roof type of house somewhat colder for the fowls at night.

In order to keep the house cool during the warm season two doors are provided in the rear wall of each section of the building, opening underneath the nest boxes. When these doors are open, as in summer, the wind has unobstructed passage through the house and the fowls when on the perches remain comfortable even on very sultry nights.

This house has been in use for a year and seems to be well

INTERIOR VIEW SHOWING OPENING TO NEST BOXES UNDERNEATH THE PERCHES

adapted to West Virginia conditions. It should face the south or southeast, and if a wind break is provided opposite the open side so much the better.

One of the advantages of this house is that the fowls always have plenty of fresh air and consequently remain healthier than where they are compelled to breathe impure air too often found in poultry houses. The free circulation of air too prevents any condensation of moisture on the walls of the building during frosty weather, and the litter on the floor constantly remains crisp and dry. Fowls remain healthier in a cold dry house than in a warm damp one.

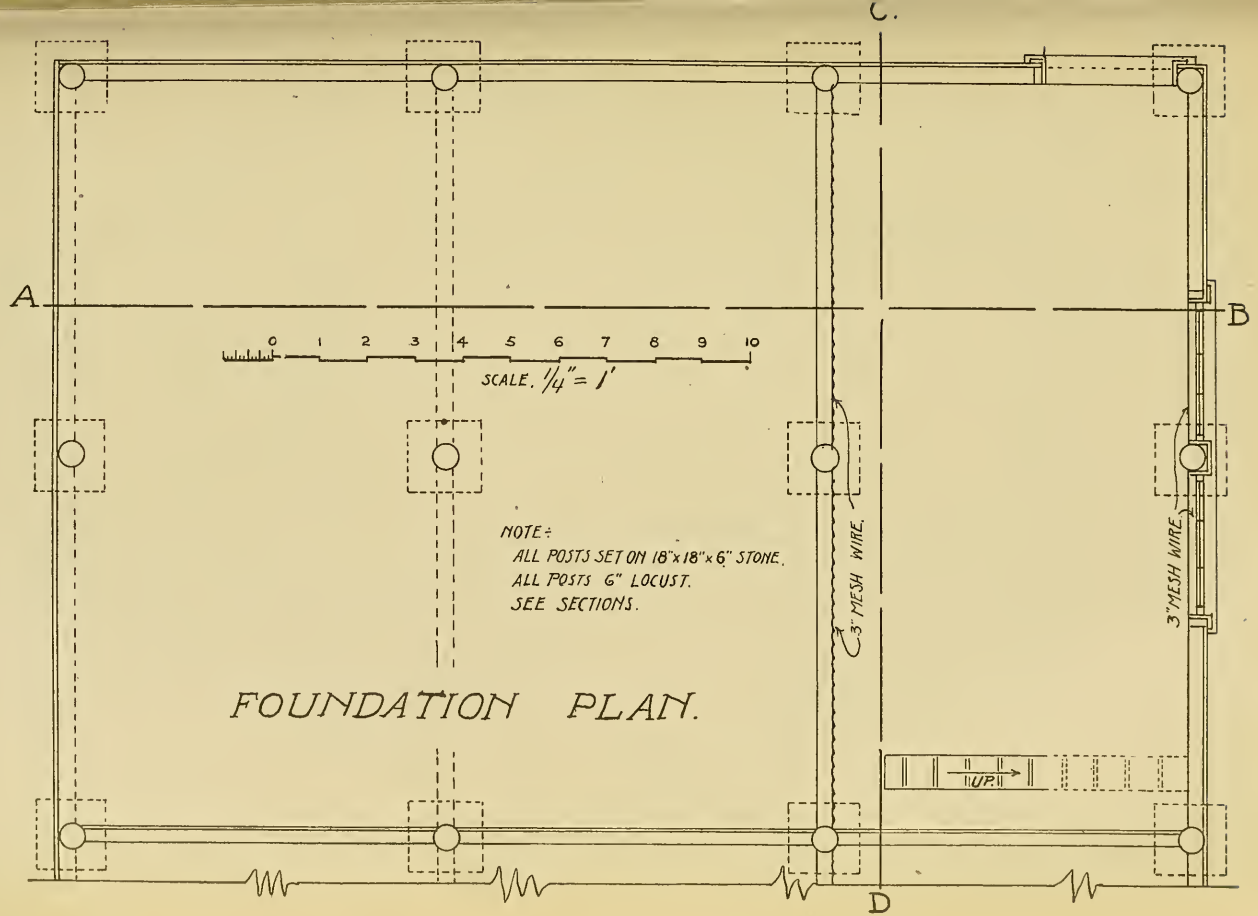
The house was built by contract and cost $450, complete. Four hundred Leghorns can be housed comfortably in it.

The cuts drawn to scale show the details of construction, and the bill of material for one section of the house including both sides is appended hereto. If two or more sections are constructed multiply the amount of material required for one section by the number of sections, and deduct the amount of ceiling to board up one side.

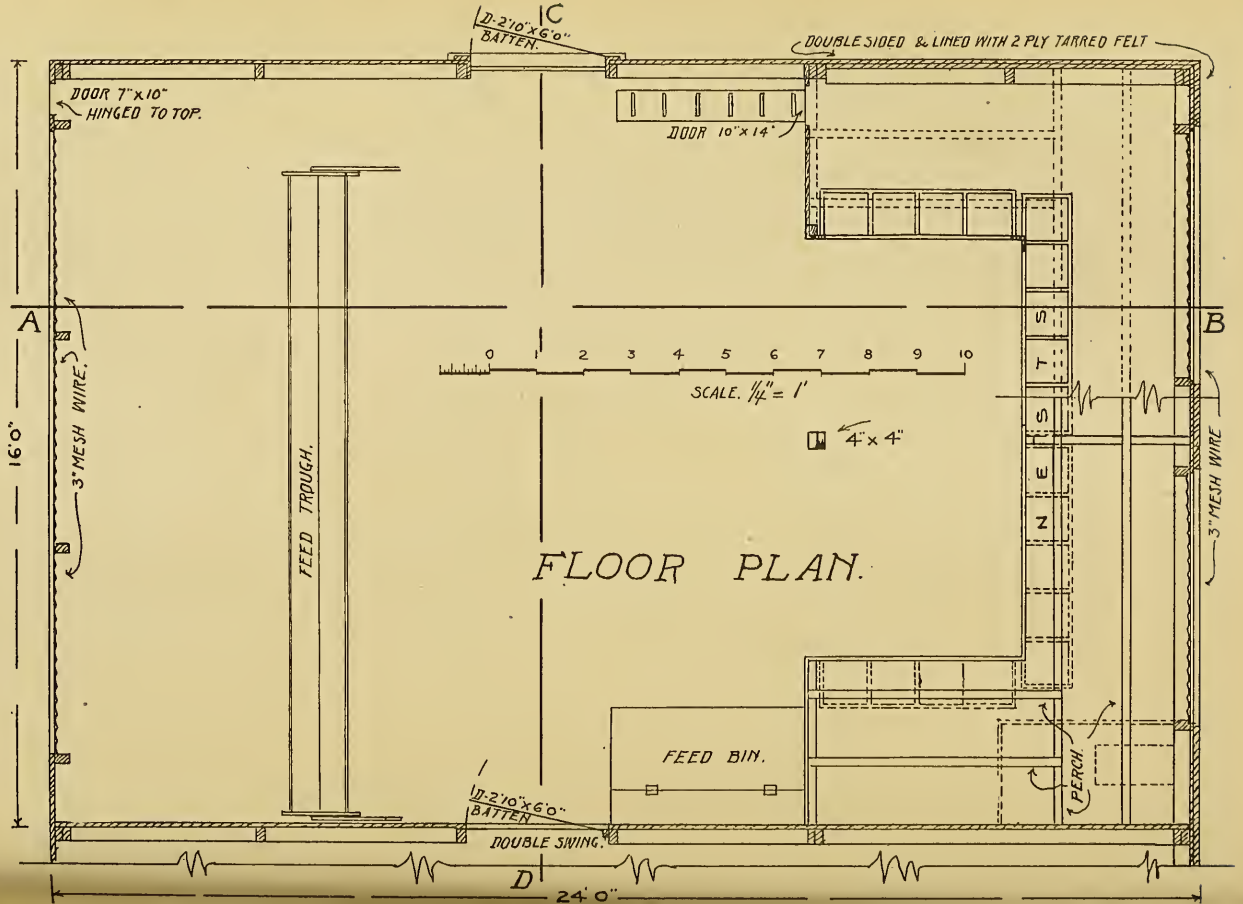
BILL OF MATERIALS FOR MODEL POULTRY HOUSE. ONE SECTION ONLY, 24′x16′.

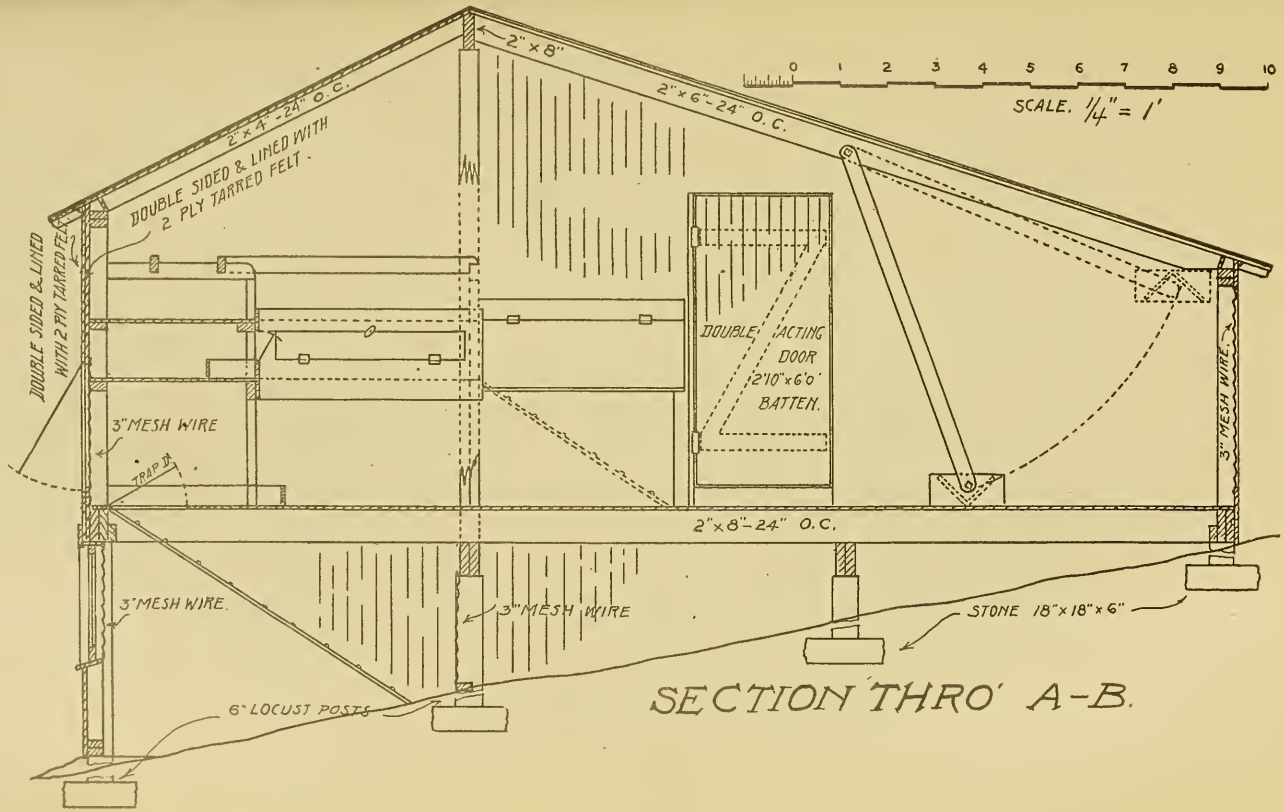
6 pcs. posts, 6″x2′ 6″ locust.
3 pcs. posts, 6″x3′ 6″ locust.
3 pcs. posts, 6″x4′ 6″ locust.
11 pcs. joist, 2″x8″—16′ 0″ long, hemlock.
11 pcs. joist, 2″x8″— 8′ 0″ long, hemlock.
9 pcs. sills, girders, etc., 2″x8″—16′ 0″ long, hemlock.
14 pcs. plates and joist bearers, 2″x4″—16′ 0″ long, hemlock.
40 pcs. studding, etc., 2″x4″—12′ 0″ long, hemlock.
9 pcs. rafters, 2″x6″—18′ 0″ long, hemlock.
9 pcs. rafters, 2″x4″—10′ 0″ long, hemlock.
50 ft. b. m. patent siding, 5″ face, poplar.
700 ft. b. m. shiplap, 5″ face, poplar.

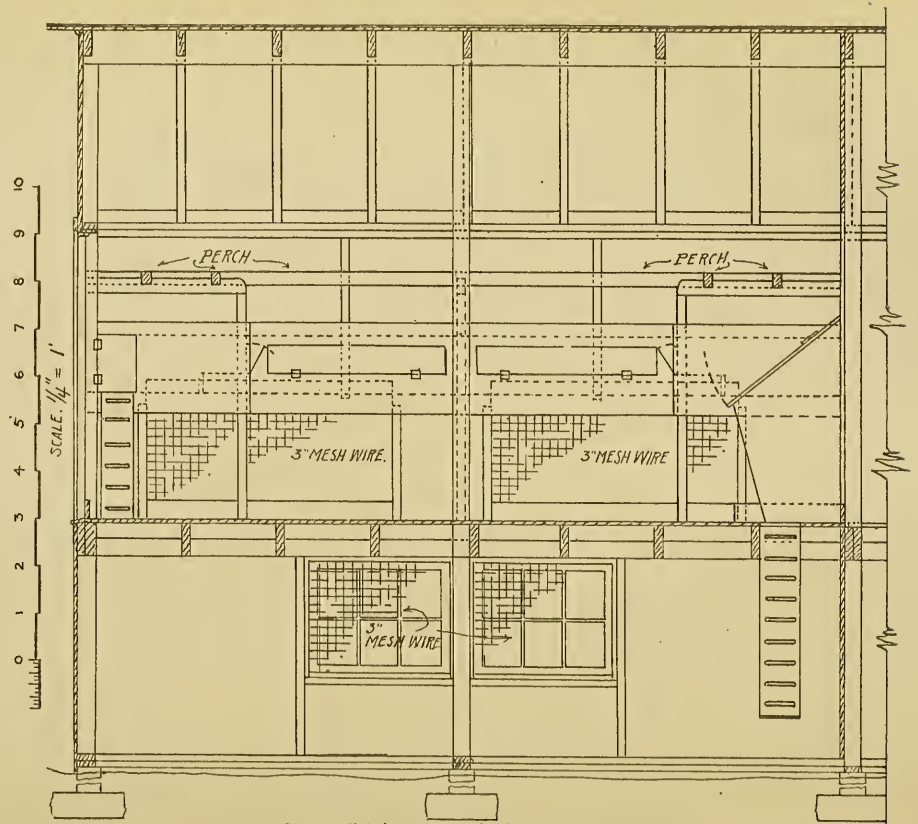
600 ft. b. m. roof sheathing, 4″ common No. 2 y. p. flooring.
350 ft. b. m. double surfaced y. p. ceiling, ⅞″x4″ No. 2 com.
600 ft. b. m. flooring, matched y. p. 3½″ face, No. 2.
75 ft. b. m. ceiling, ⅝″x3″ matched and bearded, y. p. No. 2.
2 pcs. ⅞″x10″—16′ 0″ long, S-4-S, poplar, feed trough.
1 pcs. ⅞″x 4″—16′ 0″ long, S-4-S, poplar, feed trough.
1 pcs. ⅞″x 7″—16′ 0″ long, S-4-S,poplar, nests.
4 pcs. ⅞″x 5″—10′ 0″ long, S-4-S,poplar, nests.
1 pcs. ⅞″x 8″—12′ 0″ long, S-4-S, poplar, gangs.
2 pcs. ⅞″x 5″—12′ 0″ long, S-4-S, poplar, gangs.
1 door frame, 2′ 10″x6′ 0″—½″x1¾″ rebate strip, poplar.
1 door frame, 2′ 8″x4′ 0″—½″x1¾″ rebate strip, poplar.
1 door frame, 2′ 11½″x6′ 5″—fitted with 1½″x1½″ hinge strip for double acting door, poplar.
2 doors, 2′ 10″x6′ 0″—⅞ double surfaced, matched and beaded batten doors with ⅞″x4″ battens, poplar.
1 door, 2′ 8″x4′ 0″—⅞″ double surfaced, matched and beaded batten door with ⅞″x4″ battens, poplar.
1 mullion window frame, 2 single sash, 6 lt. 10″x12″, poplar.
2 sash, 1⅜″—6 lt. 10″x12″, glazed S. S. A. glass.
5 squares composition tarred felt roofing, 2 ply, first quality.
2 squares tarred building felt, 2 ply.
14 lin, ft. mesh wire, 3″ sq. mesh. 50″ wide, No. 20. wire.
14 lin, ft. mesh wire, 3″ sq. mesh. 32″ wide, No. 20. wire.



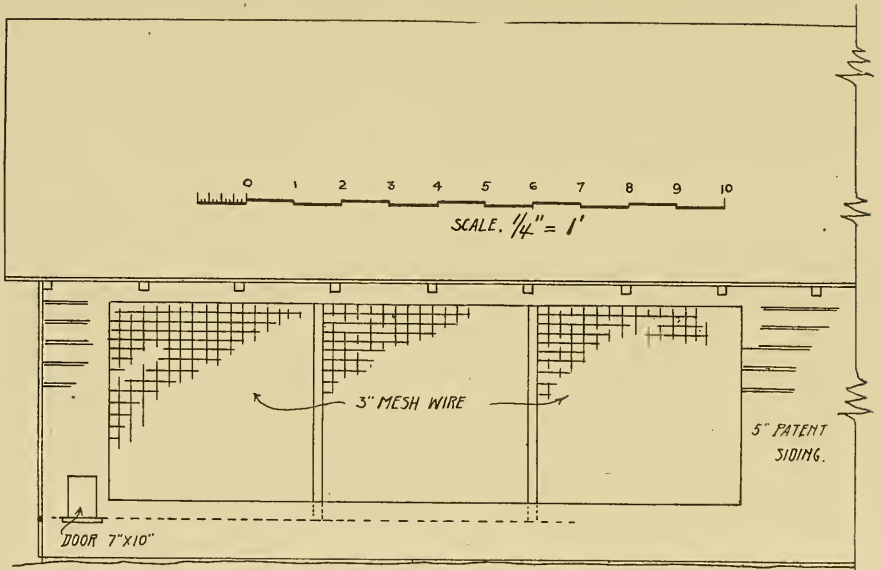
FOUNDATION PLAN.


C
11-2'10" x 6'0" BATTEN.
DOUBLE SIDED & LINED WITH 2 PLY TARRED FELT
DOOR 7" x 10" HINGED TO TOP.
DOOR 10" x 14"
A
B
16'0"
3" MESH WIRE.
FEED TROUGH.
0 1 2 3 4 5 6 7 8 9 10
SCALE. 1/4" = 1'
4" x 4"
NESTS
3" MESH WIRE
FLOOR PLAN.
FEED BIN.
PERCH.
11-2'10" x 6'0" BATTEN.
DOUBLE SWING.
D
24'0"

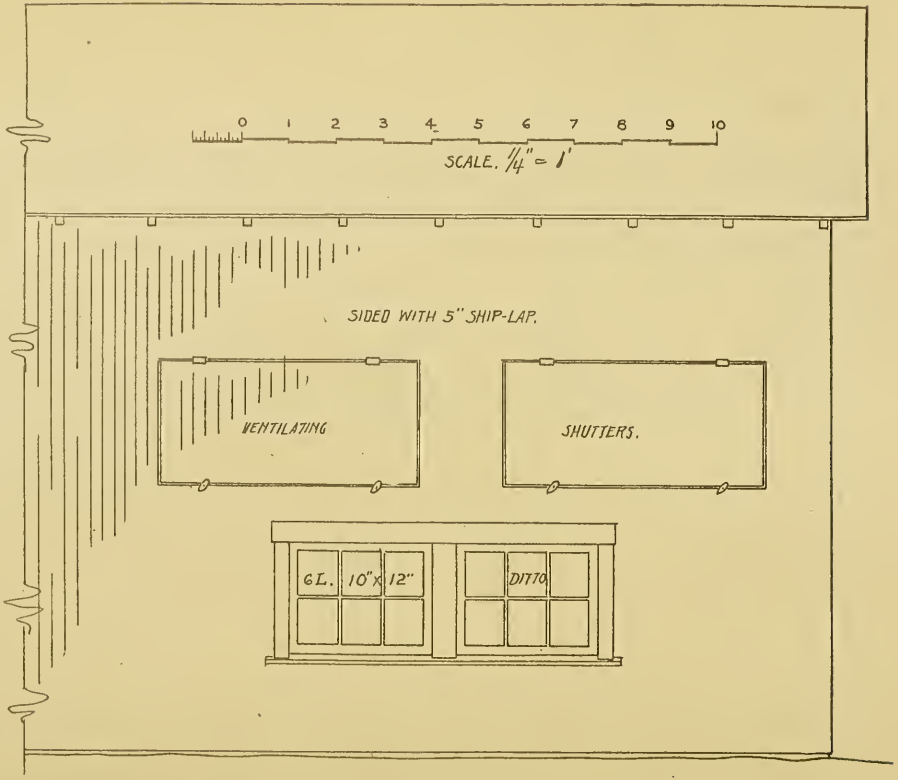

2"×8"
2"×6"-24" O.C.
2"×4"-24" O.C.
DOUBLE SIDED & LINED WITH 2 PLY TARRED FELT.
DOUBLE SIDED & LINED WITH 2 PLY TARRED FELT.
0 1 2 3 4 5 6 7 8 9 10
SCALE. 1/4" = 1'
DOUBLE ACTING DOOR 2'10"×6'0" BATTEN.
3" MESH WIRE
TRAP
3" MESH WIRE
2"×8"-24" O.C.
3" MESH WIRE.
3" MESH WIRE
STONE 18"×18"×6"
6" LOCUST POSTS
SECTION THRO' A-B.



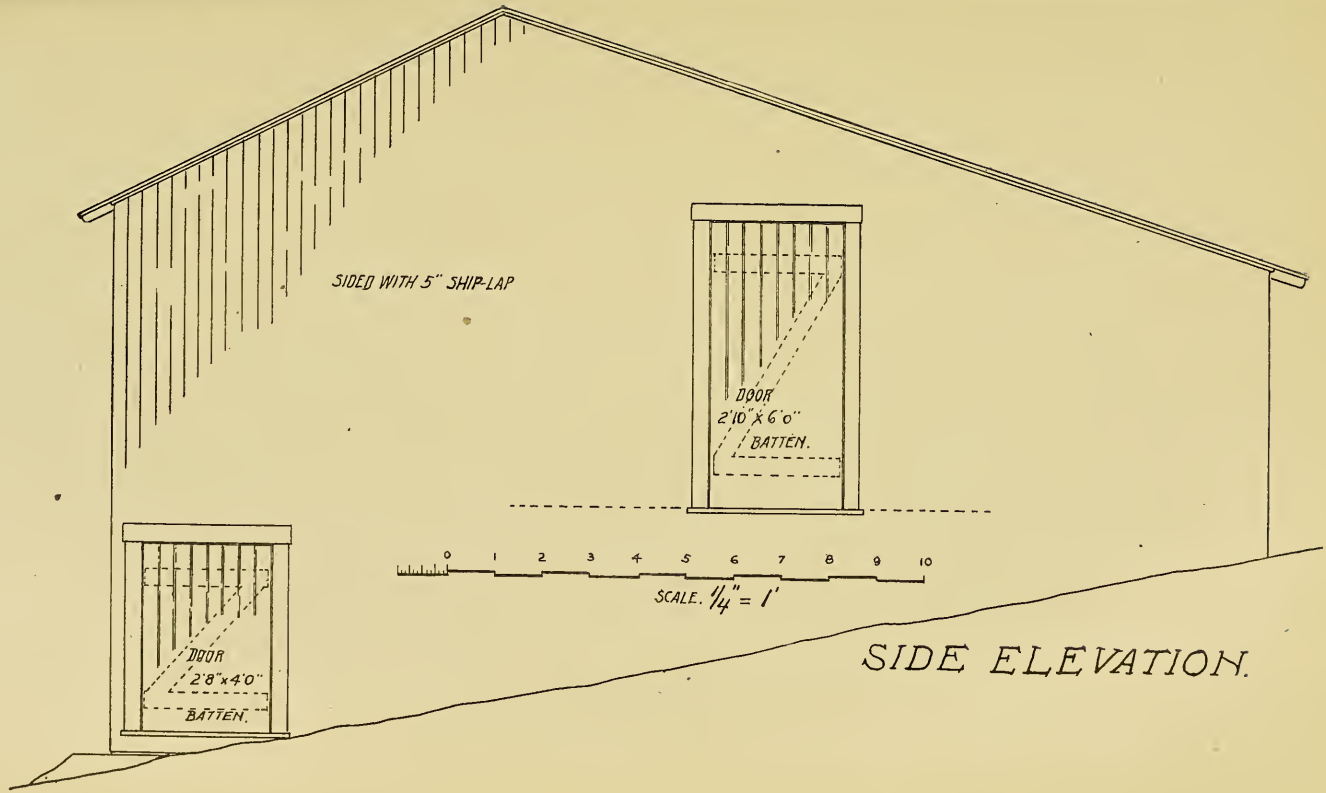
SECTION THRO' C-D.



FRONT ELEVATION



REAR ELEVATION



SIDE ELEVATION.